July 23, 2015
Proposal No. 5-917-17934-0

City of Kirkland Planning and Community Department
123 Fifth Avenue
Kirkland, Washington 98033

Attention: Mr. Scott Guter, LEED AP

Subject: **Third Party Geotechnical Engineering Review**
Portofino Short Plat
10425 NE 43rd Street
Kirkland, Washington 98033

Dear Scott:

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), recently reviewed the Critical Area Study prepared by ABPB Consulting titled: *Geotechnical Review, Proposed House Layouts, Portofino, NE 43rd Street, Kirkland, Washington,* Project No. 1379, dated March 18 and June 10, 2015 for a parcel of land (Portofino Short Plat, Steve Burnstead Construction, LLC) that is planned to be developed off the cul-de-sac at the end of NE 43rd Street in Kirkland, Washington. These documents supplement the works previous done by Geotech Consultants, Inc., titled:

- *Geotechnical Engineering Study, Proposed Plat, Northeast 43rd Street at Burlington Northern Railroad, Kirkland, Washington*, Job No. 97219, dated July 10, 1997;
- *Slope Setback Reduction, Lots 3 and 4 of Dadvar Short Plat, Northeast 43rd Street, Kirkland, Washington*, Job No. 03286, dated July 3, 2003; and
- *Review of Slope Setbacks on Topographic Survey, Lots 3 and 4 of Dadvar Short Plat, Northeast 43rd Street, Kirkland, Washington*, Job No. 03286, dated September 17, 2003.

Other documents that were reviewed during our evaluation are listed below:

- Portofino Short Plat, Kirkland, WA (Steve Burnstead Construction, LLC), McCullough Architects, Job No, dated June 4, 2015;
- Portofino Short Plat, Steve Burnstead Construction, LLC, Decker Consulting Engineers, Project No. 2013033, not dated;
- Assessment of Slope Stability and Development of the Property for Residential Purposes, Lot 2, Kirkland S.P. SS-1-86-62 (4510 Lake Washington Blvd.), Kirkland, Washington, Geotechnical & Environmental Services, Inc., Job No. 99-11-20, dated November 9, 1999;

11810 North Creek Parkway N
Bothell, Washington 98011
(425) 368-1000 Phone
(425) 368-1001 Facsimile
www.amecfw.com

- Subsurface Exploration, Geologic Hazard and Geotechnical Engineering Report, Spear Residential Site, 10101 NE 46th Street, Kirkland, Washington, Associated Earth Sciences, Inc., Project No. 9111-02G, dated November 26, 1991;
- Additional Subsurface Exploration Results, Lots 36 and 37, Lake Washington Boulevard Site, Kirkland, Washington, Earth Consultants, Inc., Job No. E-1325-2, dated July 18, 1983;
- Preliminary Geotechnical Engineering Study, Proposed Lake Washington Condominiums, 4400 Block, Kirkland, Washington, Earth Consultants, Inc., Job No. E-1325, dated July 8, 1980;
- Surface Water Hydrology Of Proposed Yarrow Village Project, CH2M Hill, project No. S13761, Dated September 1981;
- Geologic Constraint Study, Selected Slope Areas, For The City of Kirkland, Roger Lowe Associates, dated March 29, 1976; and
- Soil Survey of King County Area Washington, United States Department of Agriculture, Soil Conservation Service, dated 1973.

To supplement our literature search, Amec Foster Wheeler also conducted a site visit of the Dadvar/Portofino Short Plat on July 10, 2015.

The purpose of our review was to provide a third-party review of the Critical Area Study to verify that it complied with the City of Kirkland Zoning Code, Chapter 15 – Low Density Residential Zones, Sections 15.10.050, and Chapter 85 – Geologic Hazard Areas, as detailed in your correspondence dated June 15, 2015. Amec Foster Wheeler received your Noticed to Proceed on July 8, 2015. The review was requested because the location of the subject site lies within the Lakeview Landslide and Seismic Hazard Area as defined by the City of Kirkland Comprehensive Plan.

SITE AND PROJECT DESCRIPTION

The project site is located off the cul-de-sac at the end of NE 43rd Street and is bounded to the east by the Cross Kirkland Corridor, an unnamed drainage to the south, NE 43rd Street and residential properties to the north, and residential properties to the west. The original development planned as the Dadvar/Portofino Short Plat proposed developing 5 lots. During the initial development of this short plat, some utilities were installed for the residential development. Later in time, four lots of the original lots were sold to Steve Burnstead Construction, LLC (Burnstead) for development. These four lots plus some additional acreage were then re-plotted by Burnstead into six lots for homes and their associated infrastructure. The Burnstead Short Plat is comprised of Lots 2 through 5 of the original

Dadvar/Portofino Short Plat described in the Geotech Consultants, Inc. and ABPB Consulting geotechnical report and supplemental letters.

As previously noted, the site has been partially developed with underground utilities being installed to service the original five lots planned in the Dadvar/Portofino Short Plat. The topography at the site slopes down to the west moderately over most of the property, but slopes steeply down at the southwest portion of the property. An unnamed drainage lies adjacent to the southern property boundary that flows in roughly an east to west direction, but was dry during our site visit. The slope inclination ranges between 15 to 60 percent and meets the criteria as a critical area in accordance with the City of Kirkland's Comprehensive Plan.

According to test pit explorations conducted by Geotech Consultants, Inc., and ABPB Consulting, the site has 3 to 6 feet of loose to medium dense sand with some silt to silty soils (SP-SM) mantling glacial till soils (SM) to the full depth of the explorations, ranging from 5 to 11 feet below the ground surface. The glacial till is composed of a mixture of silt, sand, and gravel that was overridden by the Fraser glaciers, over-consolidating the soils to densities ranging from dense to very dense. Thus, these materials possess relatively high shear strengths, low compressibility, and low permeability. According to the Soil Survey of King County Area Washington, United States Department of Agriculture, Soil Conservation Service, dated 1973, the surface soils underlying the project site are composed of Alderwood gravelly sandy loam, 6 to 15 percent slopes (Agc) and Alderwood gravelly sandy loam, 15 to 30 percent slopes (Agd). The Agd soils are noted as being a severe erosion hazard.

It was also noted that no groundwater was encountered in any of the explorations. The regional ground water was reported to be present at elevations ranging between 60 to 70 feet. The oxidized soils occurring in the explorations suggest that a perched groundwater condition could manifest itself atop the very dense glacial till soils during periods of extreme wet weather during the winter and spring months. Perched groundwater levels fluctuate in response to precipitation patterns and changes in site development.

No known faults have been mapped within the immediate vicinity of the subject site, although past studies have indicated that the Seattle Fault Zone crosses the northern end of Mercer Island, approximately 4 to 5 miles south of the subject site.

REVIEW COMMENTS

Amec Foster Wheeler reviewed the geotechnical reports and supplemental letters to determine if they meet the criteria specified within the City of Kirkland Zoning Code, Chapter 15 – Low Density Residential Zones (RS, RSX, RSA, WD II, PLA 3C, PLA 6C, PLA 6E, PLA 16), Sections 15.10.050 and Chapter 85 – Geologic Hazard Areas, Sections 85.15 and 85.25, and the City of Kirkland Comprehensive Plan for properties being developed in Lakeview Landslide and Seismic Hazard Area. These sections and subsections detail the requirements for a critical areas study that is to be submitted for developments located in a Critical Area within the City of Kirkland boundary.

Amec Foster Wheeler has the following comments:

1. The slope stability analysis provided in the Geotech Consultants, Inc. report *Slope Setback Reduction, Lots 3 and 4 of Dadvar Short Plat, Northeast 43rd Street, Kirkland, Washington*, dated July 3, 2003 may be out of date. The currently proposed residential structures are not in the same location as proposed for the original lots. Some of the new structures are now closer to the top of the slope and are within the buffer zone of the old study. We recommend performing slope stability analyses for the current development conditions.
2. The seismic requirements for the current building codes have changed since the preparation of Geotech Consultants, Inc., slope stability analysis in 2003. We recommend updating the seismic slope stability analyses by using a seismic acceleration based on a probability of exceedance of 2 percent in 50 years, which is specified by IBC 2012 and ASCE 7-10. (This will result in a higher acceleration than was used previously.)
3. The slope stability analyses should model the present stability, stability during construction, and stability after all development activities are completed; the analyses should address the site and any affected adjacent properties, as specified in the Kirkland Zoning Code Section 85.15, 4.a.

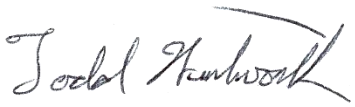
CLOSURE

It should be noted that our scope of work for this letter was limited to a review of the documents supplied to us and our site visit to the project site. Our scope did not include exploration of actual subsurface conditions, nor does our review purport to verify the accuracy of the geotechnical engineering results presented within the documents provided.

We hope this letter meets your current needs. If you have any questions, please do not hesitate to contact us at your convenience.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.



Todd D. Wentworth, P.E., L.G.
Senior Associate Geotechnical Engineer

Reviewed by: Henry W. Brenniman, L.E.G.